Amendments to the Claims

Listing of Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application.

claims 1-21 and 41 - (previously cancelled).

22-29 (currently cancelled)

30. (Currently amended) A personal active noise attenuating system ~~as in Claim 22 wherein~~comprising:

a heteronomous electronic controller ~~comprising an algorithmic transfer function~~ and a control actuator comprising a radius of reverberation;

~~said system has two~~ a first and second electro-acoustic ~~means~~ transducer mounted on opposite sides of ~~said~~ a head support structure;~~,~~

a first actuator ~~means~~ located ~~on each side of said the structure~~ adjacent to the first electro-acoustic transducer and a second actuator locate adjacent to the second transducer, wherein the ~~an said~~ first and second electro-acoustic transducers ~~means and defining~~ define a zone~~zones~~ of reverberation on each side of ~~said~~ the support structure adjacent a wearer's ears, ~~said~~ wherein the first and second electro-acoustic transducers ~~means~~ are each adapted to be movable within said zones ~~to~~ so as to provide an unchanging--transfer function estimate ~~of the algorithm~~for a filtered reference which does not need to be updated, and whereby ~~the~~a transfer function is identified for all frequencies within the control bandwidth and thus is specified independent of the nature of the disturbance signal;

an adaptive feedforward component utilizing the transfer function estimate ~~of~~ for the heteronomous electronic controller which is adapted to attenuate tonal noises, and

a feedback component of the heteronomous electronic controller which is adapted to attenuate broadband noises; and

a linear combiner adapted for summing a linear combination of the adaptive feedward component and the feedback component so as to generate a heteronomous control signal.

31. (Currently amended) ~~A~~ The system as in Claim 30, wherein ~~said~~ the first electro-acoustic transducer ~~means includes~~comprises a first adjuster, and wherein the second electro-acoustic transducer comprises a second adjuster, and wherein the first and second adjusters are adapted to move ~~an adjustable gear means which moves~~ the first and second electro-acoustic transducers ~~means~~ within a range relative to the first and second actuators, and ~~actuator means~~ wherein the ~~algorithm~~ transfer function remains virtually unchanged.

32. (Currently amended) ~~A~~ The system as in Claim 31 wherein ~~said gear means includes~~the first and second adjusters comprise a ~~rack and pinion~~geared system to move the first and second electro-acoustic transducers ~~means~~.

33. (Currently amended) ~~A~~ The system as in Claim ~~31~~ 32 wherein ~~said gear means~~the geared system is manually adjustable.

34. (Currently amended) ~~A~~ The system as in Claim ~~31~~ 32 wherein ~~said gear means~~the geared system is powered by a ~~D. C.~~ motor ~~which moves it~~adapted to move the geared system in response to a ~~as commanded by~~signal from the feedback component. ~~a feedback circuit as commanded by a wearer.~~

35. (Currently amended) ~~A~~ The system as in Claim 30 wherein ~~said~~ the first and second electro-acoustic ~~means~~ transducers comprise ~~includes a fully automated DC~~ a motorized adjuster adapted to ~~driven means which calculates~~calculate an ~~the~~ optimal position of the first and second electro-acoustic transducers ~~means~~ with respect to the noise field and ~~adjusts~~ to adjust ~~the~~ a current position of ~~said transducer~~the first and second transducers so as to optimize ~~the~~ a perceived noise reduction and field of silence dimension ~~by using~~in response to a signal from the feedback component. ~~a feedback controller to adjust the position of the said automated DC motor.~~

36. (Currently amended) ~~A~~ The system as in Claim 30 wherein ~~said~~ the adaptive feedforward component and the feedback component ~~portions~~ are linked to the first electro-acoustic transducer and the first actuator and to the second electro-acoustic transducer and the second actuator ~~each pair of acousto-electric transducer and electro-acoustic actuator means~~ so as to ~~prevent~~ minimize feedback and instabilities in the heteronomous control system.

37. (Currently amended) ~~A~~ The system as in Claim 30 wherein ~~said~~ the feedback component ~~portion~~ provides feedback control to ~~the acoustic-electric~~ transfer function by sound pressure.

38. (Currently amended) ~~A~~ The system as in Claim 30 wherein ~~the~~ an ~~acoustic-~~

~~electric~~electro-acoustic output signal provides for rejection of ~~the~~ a disturbance noise while minimizing sensitivity of the feedback ~~system~~component.

39. (Currently canceled)

40. (Currently amended) ~~A~~ The system as in Claim 31 wherein the ~~algorithm~~ transfer function is for a leaky LMS algorithm.

41. (previously canceled).

42. (new) A heteronomous controller of a personal active noise attenuation system comprising:

a feedback controller adapted for receiving an acoustically transduced signal from a noise error sensor and for generating a feedback active noise attenuating control signal portion;

a processor adapted for:

receiving the acoustically transduced signal from the noise error sensor;

receiving a noise reference signal from a noise reference signal sensor, wherein the noise reference signal is correlated with the acoustically transduced signal from the noise error sensor and is controllable from the control speaker system to the noise reference signal sensor;

applying an adaptive signal processing algorithm to the acoustically transduced signal from the noise error sensor and to the noise reference signal to generate an adaptive active noise attenuation control signal portion; and

a linear combiner adapted for summing a linear combination of the feedback adaptive active noise attenuating control signal portion and the adaptive active noise attenuation control signal portion so as to generate a heteronomous control signal; and

an electroacoustic control speaker system adapted for receiving and transducing the heteronomous control signal to create a heteronomous acoustic control signal so as to attenuate broadband portions and further attenuate tonal portions of acoustic noise transduced at the noise error sensor.

43. (New) The heteronomous controller and noise reference signal of Claim 42 further comprising a compensator adapted for canceling a corresponding feedback path of ~~the~~ a control speaker system control signal on the noise reference signal from the noise reference signal sensor before application of the adaptive signal processing algorithm.

44. (New) The heteronomous controller of Claim 42, wherein the feedback compensator is an analog filter.

45. (New) The heteronomous controller of Claim 42, wherein the feedback compensator is a digital filter.

46. (New) The heteronomous controller of Claim 42, wherein the adaptive signal processing algorithm is an adaptive feedforward algorithm.

47. (New) The heteronomous controller of Claim 42, wherein the adaptive signal processing algorithm is an adaptive feedback algorithm.

48. (New) The compensator of Claim 43, wherein the compensator is executed on the digital signal processor that executes the adaptive signal processing algorithm.

49. (New) The feedback compensator of Claim 43, wherein a sensitivity of a loop transfer function between the acoustically transduced signal from the noise error sensor and the adaptive active noise attenuating control signal portion of the heteronomous control signal is minimized.

50. (New) The heteronomous controller of Claim 42, wherein the noise error sensor is a microphone.

51. (New) The heteronomous controller of Claim 42, wherein the noise error sensor is an accelerometer.

52. (New) The heteronomous controller of Claim 42, wherein the noise error sensor is spatially adaptable in the noise field.

53. (New) The heteronomous controller of Claim 42, wherein the noise reference signal sensor is a microphone.

54. (New) The heteronomous controller of Claim 42, wherein the noise reference signal sensor is an accelerometer.

55. (New) The heteronomous controller of Claim 42, wherein the noise reference signal sensor is the noise error sensor.

56. (New) The heteronomous controller of Claim 42, wherein the noise reference signal sensor is spatially adaptable in the noise field.

57. (New) The heteronomous controller of Claim 42, wherein the personal active noise attenuation system is a headset system comprising a head-mounting portion, earcups, a noise error sensor, a noise reference signal sensor, and an electroacoustic control speaker system.

58. (New) The heteronomous controller of Claim 42, wherein the personal active noise attenuation system is a silent seat comprising a noise error sensor, a reference signal sensor, and an electroacoustic control speaker system.

59. (New) The heteronomous controller of Claim 42, wherein the linear combiner is an analog summing amplifier.

60. (New) The heteronomous controller of Claim 42, wherein the linear combiner is a proportional addition of the feedback active noise attenuation control signal portion and the adaptive active noise attenuation control signal portion in the digital signal processor.

61. (New) The heteronomous controller of Claim 42, where the linear combiner summer is selectively controlled to output varying proportions of the feedback active noise attenuation control signal portion and the adaptive active noise attenuation control signal portion.

62. (New) The heteronomous controller of Claim 42, wherein the personal active noise attenuation system is a headset and earplug system comprising a head mounting portion, earcups, and earplugs, further comprising a noise error sensor, a noise reference signal sensor, and an electroacoustic control speaker system.

63. (New) The heteronomous controller of Claim 42, wherein the personal active noise attenuation system is an earplug system comprising earplugs, a noise error sensor, a noise reference signal sensor, and an electroacoustic control speaker system.

64. (New) The heteronomous controller and earplug system of Claim 63 where earplugs are custom earmolds, foam earplugs, flanged earplugs, acrylic earplugs.

65. (New) The heteronomous controller of Claim 42, wherein the control speaker system is comprised of one or more speakers.